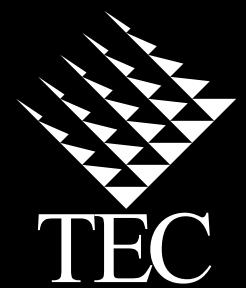


data types

dr. prof. franklin hernández.castro



tecnológico
de costa rica

H

f G

Hochschule für Gestaltung
Schwäbisch Gmünd

data types | **files or sources**

- JSON (javascript object notation)
- csv (tabular data)
 -
 - pdf
 - text file
 - wed data
 -
 - API (application programming interface: data changes very fast in time)

data types | **cards**

- JSON (javascript object notation)

JSON (javascript object notation) | **data structure**

ISO	lon	lat
“ad”	42,5000	1,5000
“ae”	24,0000	54,0000
“af”	33,0000	65,0000
“ag”	17,0500	-61,8000
...
...
“za”	-29,0000	24,0000
“zm”	-15,0000	30,0000
“zw”	-20,0000	30,0000

card

events, samples,
observations, inputs properties, data

JSON (javascript object notation) | **syntax**

ISO	lon	lat
“ad”	42,5000	1,5000
“ae”	24,0000	54,0000
“af”	33,0000	65,0000
“ag”	17,0500	-61,8000
...
...
“za”	-29,0000	24,0000
“zm”	-15,0000	30,0000
“zw”	-20,0000	30,0000

Untitled 21.rtf — Edited

Courier Regular 21 B I U >1... 16 18 20

file name: countryCenters.json

file format:

```
{  
    "ad": ["42.5000", "1.5000"],  
    "ae": ["24.0000", "54.0000"],  
    "af": ["33.0000", "65.0000"],  
    "ag": ["17.0500", "-61.8000"],  
    ...  
    ...  
    ...  
    "za": ["-29.0000", "24.0000"],  
    "zm": ["-15.0000", "30.0000"],  
    "zw": ["-20.0000", "30.0000"]  
}
```

JSON (javascript object notation) | IDs of data

ISO	lon	lat
“ad”	42,5000	1,5000
“ae”	24,0000	54,0000
“af”	33,0000	65,0000
“ag”	17,0500	-61,8000
...
...
“za”	-29,0000	24,0000
“zm”	-15,0000	30,0000
“zw”	-20,0000	30,0000

IDs

```
file name: countryCenters.json
format:
{
  "description": "coordinates of country centers",
  "countries":
    {"iso_code": "ad", "lon": 42.5000, "lat": 1.5000},
    {"iso_code": "ae", "lon": 24.0000, "lat": 54.0000},
    {"iso_code": "af", "lon": 33.0000, "lat": 65.0000},
    {"iso_code": "ad", "lon": 17.0500, "lat": -61.8000},
    ...
    ...
    ...
    {"iso_code": "za", "lon": -29.0000, "lat": 24.0000},
    {"iso_code": "zm", "lon": -15.0000, "lat": 30.0000},
    {"iso_code": "ad", "lon": -20.0000, "lat": 30.0000}
}
```

JSON (javascript object notation) | **syntax**

ISO	lon	lat
"ad"	42,5000	1,5000
"ae"	24,0000	54,0000
"af"	33,0000	65,0000
"ag"	17,0500	-61,8000
...
"za"	-29,0000	24,0000
"zm"	-15,0000	30,0000
"zw"	-20,0000	30,0000

file name: countryCenters.json
file format:

```
{  
    "ad": ["42.5000", "1.5000"],  
    "ae": ["24.0000", "54.0000"],  
    "af": ["33.0000", "65.0000"],  
    "ag": ["17.0500", "-61.8000"],  
    ...  
    ...  
    "za": ["-29.0000", "24.0000"],  
    "zm": ["-15.0000", "30.0000"],  
    "zw": ["-20.0000", "30.0000"]  
}
```

file name: countryCenters.json
format:

```
{  
    "description": "coordinates of country centers",  
    "countries":  
        {"iso_code": "ad", "lon": 42.5, "lat": 1.5},  
        {"iso_code": "ae", "lon": 24.0, "lat": 54.0},  
        {"iso_code": "af", "lon": 33.0, "lat": 65.0},  
        {"iso_code": "ad", "lon": 17.05, "lat": -61.8},  
        ...  
        ...  
        ...  
        {"iso_code": "za", "lon": -29.0, "lat": 24.0},  
        {"iso_code": "zm", "lon": -15.0, "lat": 30.0},  
        {"iso_code": "ad", "lon": -20.0, "lat": 30.0}  
}
```

JSON (javascript object notation) | [preview](#)

```
file name: countryCenters.json
file format:
{
    "ad": ["42.5000", "1.5000"],
    "ae": ["24.0000", "54.0000"],
    "af": ["33.0000", "65.0000"],
    "ag": ["17.0500", "-61.8000"],
    ...
    ...
    ...
    "za": ["-29.0000", "24.0000"],
    "zm": ["-15.0000", "30.0000"],
    "zw": ["-20.0000", "30.0000"]
}
```

```
file name: countryCenters.json
file format:
{
    "ad": [
        "42.5000",
        "1.5000"
    ],
    "ae": [
        "24.0000",
        "54.0000"
    ],
    "af": [
        "33.0000",
        "65.0000"
    ],
    "ag": [
        "17.0500",
        "-61.8000"
    ],
    ...
    ...
    ...
    "za": [
        "-29.0000",
        "24.0000"
    ],
    "zm": [
        "-15.0000",
        "30.0000"
    ],
    "zw": [
        "-20.0000",
        "30.0000"
    ]
}
```

firefox

/Users/usuario/Library/Mobile%20D X +

file:///Users/usuario/Library/Mobile Documents/com~app

JSON Raw Data Headers

Save Copy Collapse All Expand All Filter

cz:

- 0: "49.7500"
- 1: "15.5000"

de:

- 0: "51.0000"
- 1: "9.0000"

dj:

- 0: "11.5000"
- 1: "43.0000"

dk:

- 0: "56.0000"
- 1: "10.0000"

dm:

- 0: "15.4167"
- 1: "-61.3333"

do:

- 0: "19.0000"
- 1: "-70.6667"

dz:

- 0: "38.0000"

qz:

- 1: "-10.0001"

JSON (javascript object notation) | nested lists

```
25mostPopulatedCities.json — ~/Library/Mobile Documents/com~apple~CloudDocs/_documents/cursos/_IG-HfG/_semestres/u...
earthquakes.json 25mostPopulatedCities.json

1 {
2   "description": "most populated cities in teh world",
3   "source": "I forgot. I'm sorry.",
4   "cities": [
5     [
6       {
7         "city_ascii": "Tokyo",
8         "longitude": 139.7514,
9         "latitude": 35.685,
10        "country": "Japan",
11        "iso3": "JPN",
12        "population": 35676000,
13        "id": 1392685764
14      },
15      {
16        "city_ascii": "New York",
17        "longitude": -73.9249,
18        "latitude": 40.6943,
19        "country": "United States",
20        "iso3": "USA",
21        "population": 19164071,
22        "id": 1840034016
23      },
24      {
25        "city_ascii": "Mexico City",
26        "longitude": -99.131,
27        "latitude": 19.4424,
28        "country": "Mexico"
29      }
30    ]
31  ]
32}
```

```
{
  "description": "Birds of Antarctica, grouped by family",
  "source": "https://en.wikipedia.org/wiki/List_of_birds_of_Antarctica",
  "birds": [
    {
      "family": "Albatrosses",
      "members": [
        "Wandering albatross",
        "Grey-headed albatross",
        "Black-browed albatross",
        "Sooty albatross",
        "Light-mantled albatross"
      ]
    },
    {
      "family": "Cormorants",
      "members": [
        "Antarctic shag",
        "Imperial shag",
        "Crozet shag"
      ]
    },
    {
      "family": "Diving petrels",
      "members": [
        "South Georgia diving petrel",
        "Common diving petrel"
      ]
    },
    {
      "family": "Ducks, geese and swans",
      "members": [
        "Blue duck",
        "Red-breasted teal",
        "White-fronted teal",
        "Blue teal",
        "White-fronted geese",
        "Common eider",
        "Red-breasted merganser",
        "Common merganser",
        "Red-necked phalarope",
        "Red Phalarope",
        "Kittlitz's murrelet",
        "Kittlitz's murrelet"
      ]
    }
  ]
}
```

data types | **tables**

- csv (tabular data)

csv (tabular data) | **syntax**

longitude	latitude	city	population	country	iso2	iso3	capital	id
139.7514	35.685	Tokyo	35676000	Japan	JP	JPN	primary	1392685764
-99.131	19.4424	Mexico City	19028000	Mexico	MX	MEX	primary	1484247881
72.857	19.017	Mumbai	18978000	India	IN	IND	admin	1356226629
-46.625	-23.5587	Sao Paulo	18845000	Brazil	BR	BRA	admin	1076532519
77.23	28.67	Delhi	15926000	India	IN	IND	admin	1356872604
121.4365	31.2165	Shanghai	14987000	China	CN	CHN	admin	1156073548
88.3247	22.495	Kolkata	14787000	India	IN	IND	admin	1356060520
90.4086	23.7231	Dhaka	12797394	Bangladesh	BD	BGD	primary	1050529279
-58.3975	-34.6025	Buenos Aires	12795000	Argentina	AR	ARG	primary	1032717330
66.99	24.87	Karachi	12130000	Pakistan	PK	PAK	admin	1586129469
31.25	30.05	Cairo	11893000	Egypt	EG	EGY	primary	1818253931
-43.225	-22.925	Rio de Janeiro	11748000	Brazil	BR	BRA	admin	1076887657
135.4601	34.75	Osaka	11294000	Japan	JP	JPN	admin	1392419823
116.3883	39.9289	Beijing	11106000	China	CN	CHN	primary	1156228865
120.9822	14.6042	Manila	11100000	Philippines	PH	PHL	primary	1608618140
37.6155	55.7522	Moscow	10452000	Russia	RU	RUS	primary	1643318494
29.01	41.105	Istanbul	10061000	Turkey	TR	TUR	admin	1792756324
2.3333	48.8667	Paris	9904000	France	FR	FRA	primary	1250015082

csv (tabular data) | **syntax**

longitude	latitude	city	population	country	iso2	iso3	capital	id
139.7514	35.685	Tokyo	35676000	Japan	JP	JPN	primary	1392685764
-99.131	19.4424	Mexico City	19028000	Mexico	MX	MEX	primary	1484247881
72.857	19.017	Mumbai	18978000	India	IN	IND	admin	1356226629
-46.625	-23.5587	Sao Paulo	18845000	Brazil	BR	BRA	admin	1076532519
77.23	28.67	Delhi	15926000	India	IN	IND	admin	1356872604
121.4365	31.2165	Shanghai	14987000	China	CN	CHN	admin	1156073548
88.3247	22.495	Kolkata	14787000	India	IN	IND	admin	1356060520
90.4086	23.7231	Dhaka	12797394	Bangladesh	BD	BGD	primary	1050529279
-58.3975	-34.6025	Buenos Aires	12795000	Argentina	AR	ARG	primary	1032717330
66.99	24.87	Karachi	12130000	Pakistan	PK	PAK	admin	1586129469
31.25	30.05	Cairo	11893000	Egypt	EG	EGY	primary	1818253931
-43.225	-22.925	Rio de Janeiro	11748000	Brazil	BR	BRA	admin	1076887657
135.4601	34.75	Osaka	11294000	Japan	JP	JPN	admin	1392419823
116.3883	39.9289	Beijing	11106000	China	CN	CHN	primary	1156228865
120.9822	14.6042	Manila	11100000	Philippines	PH	PHL	primary	1608618140
37.6155	55.7522	Moscow	10452000	Russia	RU	RUS	primary	1643318494
29.01	41.105	Istanbul	10061000	Turkey	TR	TUR	admin	1792756324
2.3333	48.8667	Paris	9904000	France	FR	FRA	primary	1250015082
126.9997	37.5663	Seoul	9796000	"Korea, South"	KR	KOR	primary	1410836482
3.3915	6.4433	Lagos	9466000	Nigeria	NG	NGA	minor	1566593751
106.8294	-6.1744	Jakarta	9125000	Indonesia	ID	IDN	primary	1360771077
113.325	23.145	Guangzhou	8829000	China	CN	CHN	admin	1156237133
-0.1167	51.5	London	8567000	United Kingdom	GB	GBR	primary	1826645935
-77.0501	-12.048	Lima	8012000	Peru	PE	PER	primary	1604728603
51.4243	35.6719	Tehran	7873000	Iran	IR	IRN	primary	1364305026
15.315	-4.3297	Kinshasa	7843000	Congo (Kinshasa)	CD	COD	primary	1180000363
-74.0833	4.5964	Bogota	7772000	Colombia	CO	COL	primary	1170483426
114.1221	22.5524	Shenzhen	7581000	China	CN	CHN	minor	1156158707
114.27	30.58	Wuhan	7243000	China	CN	CHN	admin	1156117184
117.2	39.13	Tianjin	7180000	China	CN	CHN	admin	1156174046
80.28	13.09	Chennai	7163000	India	IN	IND	admin	1356374944
121.5683	25.0358	Taipei	6900273	Taiwan	TW	TWN	primary	1158881289
77.56	12.97	Bangalore	6787000	India	IN	IND	admin	1356410365

csv (tabular data) | **syntax**

secuencia	nombre	iso3	area	numPoligonos
0	Russian Federation	RUS	17098250	214
1	Canada	CAN	9984670	410
2	United States	USA	9831510	346
3	China	CHN	9562910	70
4	Brazil	BRA	8515770	43
5	Australia	AUS	7741220	94
6	India	IND	3287259	35
7	Argentina	ARG	2780400	8
8	Kazakhstan	KAZ	2724902	6
9	Algeria	DZA	2381740	1
10	Congo Dem. Rep.	COD	2344860	2
11	Saudi Arabia	SAU	2149690	11
12	Mexico	MEX	1964375	51
13	Indonesia	IDN	1913580	264
14	Sudan	SDN	1886068	2
15	Libya	LBY	1759540	1
16	Iran Islamic Rep.	IRN	1745150	12
17	Mongolia	MNG	1564120	1
18	Peru	PER	1285220	5

ordenDePaises.csv
1 secuencia,nombre,iso3,area,numPoligonos
2 0,Russian Federation,RUS,17098250,214
3 1,Canada,CAN,9984670,410
4 2,United States,USA,9831510,346
5 3,China,CHN,9562910,70
6 4,Brazil,BRA,8515770,43
7 5,Australia,AUS,7741220,94
8 6,India,IND,3287259,35
9 7,Argentina,ARG,2780400,8
10 8,Kazakhstan,KAZ,2724902,6
11 9,Algeria,DZA,2381740,1
12 10,Congo Dem. Rep.,COD,2344860,2
13 11,Saudi Arabia,SAU,2149690,11
14 12,Mexico,MEX,1964375,51
15 13,Indonesia,IDN,1913580,264
16 14,Sudan,SDN,1886068,2
17 15,Libya,LBY,1759540,1
18 16,Iran Islamic Rep.,IRN,1745150,12
19 17,Mongolia,MNG,1564120,1
20 18,Peru,PER,1285220,5

data types | **others**

- (other) no notation data
 - pdf
 - text file
 - wed data

world_110m.txt

```

-163.71289567772871 -78.595667413241543
-163.105800951163786 -78.223338718578589
-161.245113491846439 -78.380176690584435
-160.24620805564453 -78.693645928866943
-159.482404548154477 -79.046337579258974
-159.208183560197654 -79.497007745276406
-161.127601284814716 -79.634208673011329
-162.439846768218416 -79.281465346186991
-163.027407803377002 -78.928773695794959
-163.06660437727038 -78.869965915846805
-163.71289567772871 -78.595667413241543

-6.197884894220991 53.867565009163364
-6.032985398777611 53.153190009160497
-6.788856573910849 52.260117906292336
-8.561616583683559 51.669301255899356
-9.977085740590269 51.820454820353078
-9.166282517930782 52.864628811242682
-9.688524542672454 53.881362616585299
-8.327987433292009 54.664518947968631
-7.572167934591064 55.131622219454869
-6.733847011736145 55.172860012423783
-5.661948614921968 54.554603176483809
-6.197884894220991 53.867565009163364

141.000210402591847 -2.60015105551566
142.735246616791471 -3.28915292726321
144.583970982033236 -3.861417738463416
145.273127883077677 -4.373737888205049
145.829786411725706 -4.876497897972683
145.981921828393013 -5.465609226100043
147.648073358347574 -6.083659356310847
147.891107619416232 -6.614014580922343
146.970905389594861 -6.721656589386313
147.191873814074938 -7.388024183790023
148.084635858349316 -8.044108168167647
148.734105259393573 -9.104663588093764
149.306835158484432 -9.071435642130091
149.266630894161324 -9.514406019736029
150.038728469034254 -9.684318129111709
149.738798456012205 -9.872937106977048
150.801627638959133 -10.293686618697478
150.690574985963906 -10.582712904505925
150.028393182575826 -10.652476088099952
149.782310012001972 -10.393267103723923
148.923137648717272 -10.280922539921384
147.913018426707993 -10.13044076908745
147.135443150012179 -9.492443536011983
146.567880894150562 -8.942554619994155
146.048481073184917 -8.067414239131281
144.744167922138047 -7.630128269077446
143.897087844009661 -7.915330498896296
143.286375767184325 -8.245491224809079
143.413913202080664 -8.983068942910982
142.628431431244167 -9.326820570516524
142.068258905200253 -9.159595635620022
141.033851760013818 -9.117892754760483
140.143415155192542 -8.29716765710095
139.127766554928087 -8.096042982620979
138.881476678625006 -8.380935153846075
137.614473911692869 -8.41168263105974
138.039099155835174 -7.597882175327321

```

GENESIS 1

The Creation of the World

¹ In the beginning, God created the heavens and the earth.

² The earth was without form and void, and darkness was over the face of the deep. And the Spirit of God was hovering over the face of the waters.

³ And God said, “Let there be light,” and there was light.

⁴ And God saw that the light was good. And God separated the light from the darkness. ⁵ God called the light Day, and the darkness he called Night. And there was evening and there was morning, the first day.

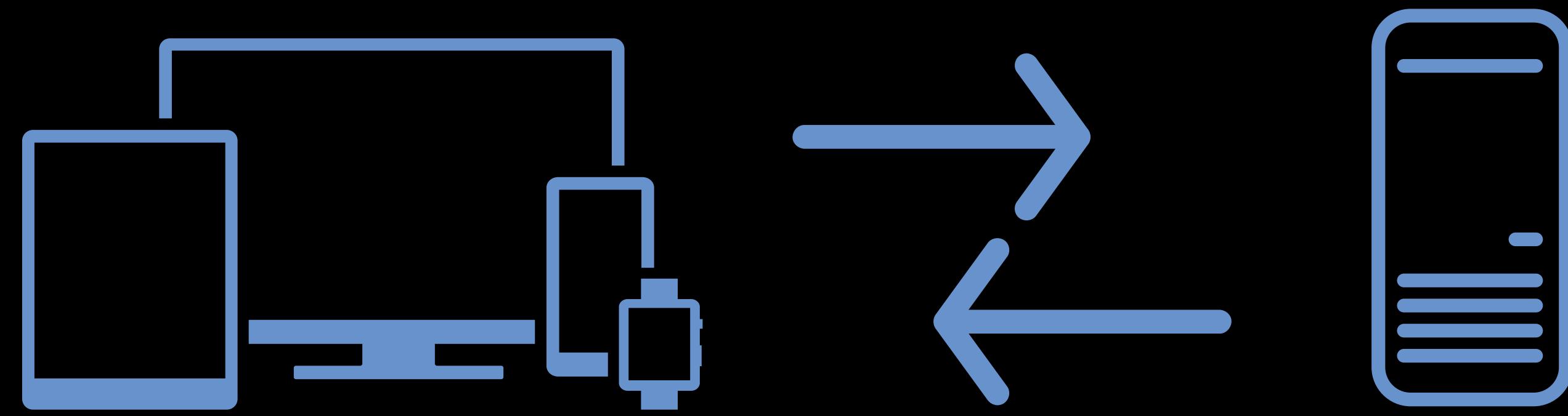
⁶ And God said, “Let there be an expanse in the midst of the waters, and let it separate the waters from the waters.” ⁷ And God made the expanse and separated the waters that were under the expanse from the waters that were above the expanse. And it was so. ⁸ And God called the expanse Heaven. And there was evening and there was morning, the second day.

⁹ And God said, “Let the waters under the heavens be gathered together into one place, and let the dry land appear.” And

data types | web data



- APIs application programming interface



data changes very fast in time

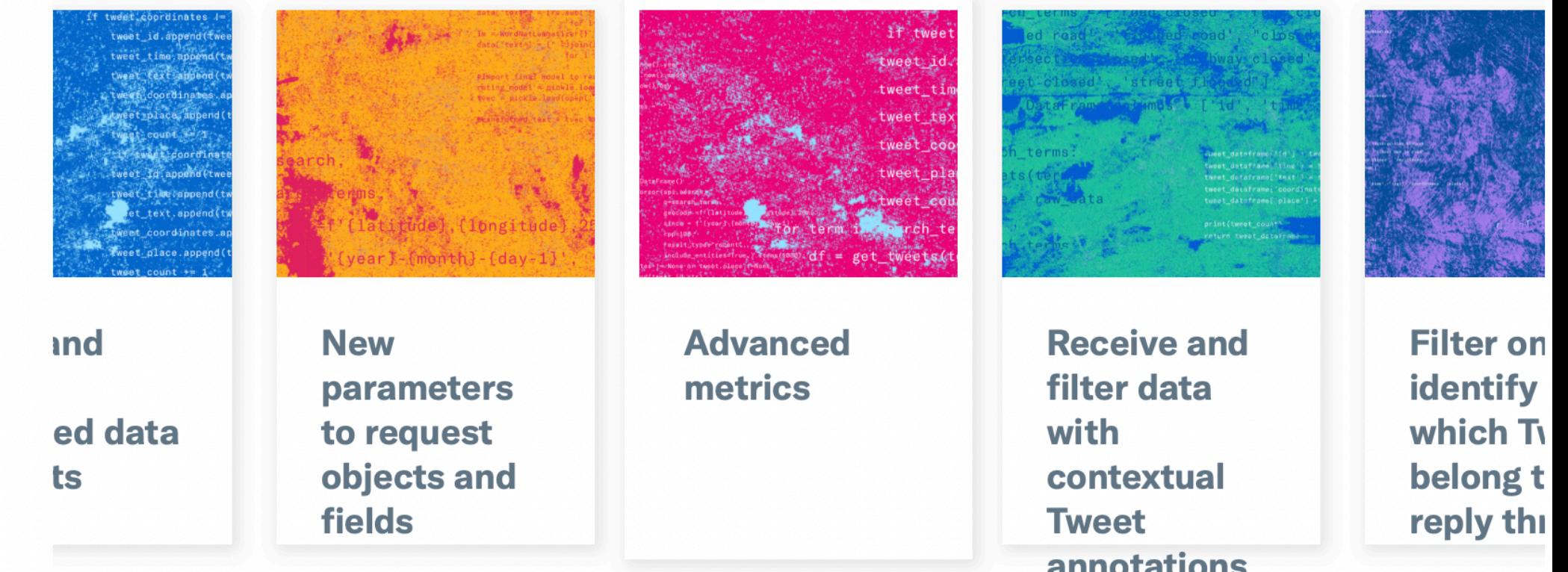
API (application programming interface: data changes very fast in time)



The homepage of Meteomatics' Weather API. The background features a dramatic sky with clouds and lightning. On the left, the text "Our Weather API" is displayed in large white letters. In the center, there is a circular icon containing the letters "API" inside a gear-like border. At the bottom, there are three buttons: "Learn more", "API Packages", and "Free API Trial". The top navigation bar includes the Meteomatics logo and links for "Weather API & Data", "Products & Solutions", and "Technology".

Twitter API v2

Twitter API v2 is ready for prime time! We recommend that the majority of developers start to think about migrating to v2 of the API, and for any new users to get started with v2. Why migrate?



The Twitter API v2 page highlights several new features:

- Find related data**: Includes a snippet of code showing how to search for tweets based on coordinates and terms.
- New parameters to request objects and fields**: Includes a snippet of code showing how to filter tweets by year, month, and day.
- Advanced metrics**: Includes a snippet of code showing how to calculate tweet counts and other metrics.
- Receive and filter data with contextual Tweet annotations**: Includes a snippet of code showing how to identify tweets belonging to a reply thread.
- Filter on identify which Tweet belong to reply this**: Includes a snippet of code showing how to filter tweets based on reply annotations.

